May 4, 2001

MEMORANDUM TO: William D. Travers
Executive Director for Operations

FROM: Ashok Thadani, Director **/RA/**
Office of Nuclear Regulatory Research

SUBJECT: CLOSURE OF GENERIC ISSUE 170, REACTIVITY TRANSIENTS AND FUEL DAMAGE CRITERIA FOR HIGH BURNUP FUEL

In 1995, less than a year after learning of new test results on reactivity transients, this generic issue was initiated to address the effects of high-burnup fuel operation on fuel damage limits used in regulation. Initial attention was on reactivity transients, which were the subject of the specific test results available at that time, but Generic Issue (GI)-170 was generalized to cover all fuel damage criteria used in licensing.

At the time GI-170 was initiated, it was associated with a High-Burnup Fuel Action Plan generated in NRR. Subsequently, an Agency Program Plan for High-Burnup Fuel was developed jointly by RES and NRR.[1] After that, NRR closed out its High-Burnup Fuel Action Plan stating that the action plan had met its purpose.[2]

Three general issues were addressed in the GI information provided initially for GI-170 and these were (1) reactivity transients, (2) loss-of-coolant accidents, and (3) specified acceptable fuel design limits.[3] In the subsequent agency program plan, reactivity accidents were further described to cover PWR rod-ejection accidents and BWR power oscillations without scram. The agency plan gave additional details on issues associated with loss-of-coolant accidents, and a related information notice was issued shortly thereafter.[4] The agency plan pointed out that no work was needed on numerous fuel design limits for normal operation because the goal of near-zero failures (leakers) is being met. For each specific issue addressed in the agency plan, a near-term assessment determined that there was no safety concern requiring immediate regulatory action.

Additional work was done to refine our understanding of the issues arising from the increase in burnups in reactor fuel. Starting in 1999, a series of meetings was held with experts in this field to develop phenomenon identification and ranking tables (PIRTs). This activity is described in a three-volume NUREG/CR report and has helped focus research efforts to resolve the most significant issues.[5-7]

In conclusion, the GI as originally defined was broad and does not involve safety concerns requiring immediate regulatory action. The specific sub-issues comprising GI-170 require long-term research for resolution and are not well suited for tracking as a formal GI. Because these sub-issues are being addressed in a confirmatory research program with substantial industry cooperation, GI-170 is being closed and each of its sub-issues will be resolved within the ongoing research program.[8-10] This approach is in accordance with draft Management Directive 6.4 and RES Office Letter 7 ACRS has reviewed our plan to close GI-170 and has no objection.

cc: C. Paperiello, DEDMRS

References

1. L. Callan, “Agency Program Plan for High-Burnup Fuel,” NRC memo to the Commissioners, July 6, 1998.

2. T. Collins “Closeout of High Burnup Fuel Action Plan,” NRC memo to G. Holahan, October 9, 1998.

3. F. Eltawila, “Generic Issue on Fuel Damage Criteria for High Burnup Fuel,” NRC memo to C. Serpan, May 4, 1995.

4. “Predicted Increase in Fuel Rod Cladding Oxidation,” NRC Information Notice 98-29, August 3, 1998.

5. B. Boyack et al., “Phenomenon Identification and Ranking Tables (PIRTs) for Rod Ejection Accidents in Pressurized Water Reactors Containing High Burnup Fuel,” draft on web at www.nrc.gov/RES/PIRT.

6. B. Boyack et al., “Phenomenon Identification and Ranking Tables (PIRTs) for Power Oscillations Without Scram in Boiling Water Reactors Containing High Burnup Fuel,” draft on web at www.nrc.gov/RES/PIRT.

7. B. Boyack et al., “Phenomenon Identification and Ranking Tables (PIRTs) for Loss-of-Coolant Accidents in Pressurized and Boiling Water Reactors Containing High Burnup Fuel,” draft on web at www.nrc.gov/RES/PIRT.

8. “IPSN-NRC Cabri Water Loop Agreement” signed by M. Livolant (IPSN, December 4, 2000) and W. Travers (NRC, January 25, 2001). Similar EPRI agreement pending.

9. “Agreement on the OECD Halden Reactor Project Covering the Period 1st January 2000 to 31st December 2002" signed by W. Travers (NRC, March 2000). Similar agreements for EPRI, C-E (now Westinghouse) and GE (now Global Nuclear Fuels) are pending.

10. “MOU on Cooperative Nuclear Safety Research Between NRC and EPRI, Addendum on Testing of High Burnup Fuel” signed by M. Knapp (NRC, February 12, 1998) and R. Jones (EPRI, February 12, 1998).

In conclusion, the GI as originally defined was broad and does not involve safety concerns requiring immediate regulatory action. The specific sub-issues comprising GI-170 require long-term research for resolution and are not well suited for tracking as a formal GI. Because these sub-issues are being addressed in a confirmatory research program with substantial industry cooperation, GI-170 is being closed and each of its sub-issues will be resolved within the ongoing research program.[8-10] This approach is in accordance with draft Management Directive 6.4 and RES Office Letter 7 ACRS has reviewed our plan to close GI-170 and has no objection.

cc: C. Paperiello, DEDMRS

Distribution
SMSAB R/F
RMeyer R/F
PNorian
DSARE R/F
RSavio, ACRS

C:\GSI09.wpd
*See previous concurrence
OAR in ADAMS? (Y or N) Y ADAMS ACCESSION NO.: _____ TEMPLATE NO. RES-006
Publicly Available? (Y or N) Y DATE OF RELEASE TO PUBLIC 5 days SENSITIVE? NO
To receive a copy of this document, indicate in the box: "C" = Copy without enclosures **"E"** = Copy with enclosures **"N"** = No copy

OFFICE	SMSAB		AC:SMSAB		ABC:REAHFB		AD:DSARE		DD:RES	
NAME	RMeyer:adl		JRosenthal		JFlack		FEltawila		RZimmerman	
DATE	04/18/01*		04/18/01*		04/18/01*		04/19/01*		05/03/01*	
OFFICE	DDSSA:NRR		AD:ADPT:NRR		D:NRR		D:RES			
NAME	GHolahan		BSheron		SCollins by:BSheron		AThadani			
DATE	05/01/01*		05/02/01*		05/02/01*		05/02/01		/ /01	

(RES File Code) RES